

CHAPTER 36. MONITOR CONTINUOUS AIRWORTHINESS MAINTENANCE PROGRAM/REVISION

SECTION 1. BACKGROUND

1. PROGRAM TRACKING AND REPORTING SUBSYSTEM (PTRS) ACTIVITY CODES.

A. *Maintenance: 3637*

B. *Avionics: 5637*

3. OBJECTIVE. This chapter provides guidance for ensuring that the operator's total continuous airworthiness maintenance program (CAMP) includes the maintenance/inspection tasks necessary to maintain its aircraft in an airworthy condition.

5. GENERAL.

A. *Definitions.*

(1) *Scheduled Maintenance.* A group of tasks, accomplished at specified intervals, that prevent deterioration of the safety and reliability levels of the aircraft.

(2) *Unscheduled Maintenance.* A group of tasks resulting from scheduled maintenance, reports of malfunctions, and data analysis, used to restore equipment to acceptable safety and reliability levels.

(3) *Accountability.* For the purposes of this job task, "accountability" refers to the procedures established by the operator to control the issuance and return of completed job cards, non-routine coupons/sheets, and other work forms issued during any maintenance/inspection function.

(4) *Work Packages.* Work packages contain detailed instructions, standards, methods, and techniques for performing a task and may be presented as work forms, job cards, and/or other accepted methods. A work package satisfies accountability and recordkeeping requirements.

B. *Continuous Airworthiness Maintenance Program.*

(1) Operators operating under Title 14 of the Code of Federal Regulations (14 CFR) parts 121/135 (10 or more) and 129, section 129.14 are required to have a CAMP. The total CAMPs must be detailed in the operator's manual system. The manual(s) must contain specific maintenance and inspection tasks, including methods, standards, and techniques for accomplishing these tasks.

(2) There are additional programs required by the regulations, including training programs, continuing analysis and surveillance programs, recordkeeping and

reporting systems, etc. These programs are an important part of the total CAMPs and are used to support the maintenance tasks.

(3) An approved CAMP establishes the operator as a maintenance entity, and when followed, ensures the continued airworthiness of an aircraft and its equipment.

C. *Operations Specifications (OpSpecs).* The scheduled maintenance program is derived from the approved requirements stated in the operator's OpSpecs. The operator must have work forms, job cards, and/or other methods to accomplish the scheduled maintenance program and have manual procedures for implementing each special authorization.

NOTE: OpSpecs are considered to be as legally binding as the regulations themselves.

7. PERFORMING THE INSPECTION.

A. *The Certificate-Holding District Office (CHDO).*

Since the operator is required to provide the appropriate manuals containing the CAMP to the CHDO, the majority of this task is performed there. At a minimum, the CHDO must be provided with the following:

- The general maintenance manual
- Detailed instructions for accomplishing the scheduled maintenance/inspection program
- Aircraft manufacturer's maintenance manuals incorporated by the operator, including the illustrated parts catalogue

B. *Maintenance Facility.* The CHDO normally does not have, and is not required to have, all of the repair/overhaul manuals for engines, propellers, and appliances. The Aviation Safety Inspector (ASI) must therefore go to the operator's facility to ensure that the operator has the appropriate instructions and standards to accomplish its repair/overhaul maintenance functions.

C. *Manual System.* The operator's manual system must define every facet of the CAMP, and should consist of the following:

(1) *General Maintenance Manual.* The manual(s) containing general information on how the operator conducts its business. These manuals contain the scheduled maintenance program instructions and requirements for a specific type of aircraft. The manuals must include

provisions for accountability and for meeting the recording requirements of 14 CFR sections 121.380 and 135.439, and may include the following:

- Instructions to accomplish scheduled checks (lettered, phased, numbered, etc.), including the job cards for accomplishing these checks
- Job cards for accomplishing recurring non-routine maintenance, i.e., engine change cards, propeller change cards

(2) *Technical Manuals for Maintenance Standards and Methods.* These manuals contain the standards for overhaul, repair, replacement, calibration, and other requirements to return the aircraft and its components to its original or properly altered condition. They consist of the current manufacturer's maintenance/overhaul manuals and/or other standards developed by the operator and accepted by the Federal Aviation Administration (FAA).

D. Key Areas of the Maintenance Program.

(1) *Aircraft Inspection Requirements.* This area includes routine inspections and tests performed on the aircraft at prescribed intervals.

(a) In the past, operators have been approved to use maintenance programs developed by operators with similar equipment but greatly different operational environments. To ensure that the aircraft is maintained properly, it is imperative that whatever combination of inspection intervals are used (calendar time, cycles, or hours), that the inspection is performed by whichever interval occurs first. This compensates for differences or changes in the operator's operational environment.

(b) Those operators that do not have calendar time requirements must equate the current aircraft utilization in hours to a calendar date. For example, an operator has operated 3,000 hours in the past 12 months and has a 3,000 hour inspection interval. The inspection requirement should therefore be 3,000 hours or 12 months, whichever comes first.

(2) *Scheduled Maintenance.* This area concerns maintenance tasks performed at prescribed intervals.

(a) Some scheduled maintenance tasks are accomplished concurrently with inspection tasks, i.e., Airworthiness Directive (AD) notes and service bulletins, that are a part of the inspection element and may be included on the same form. Scheduled tasks include such items as:

- Replacement of life-limited items
- Replacement of components for periodic overhaul or repair
- Special inspection such as x-rays
- Checks or tests for on-condition items
- Lubrication

(b) *Segmented Inspections and Built-In Inspection Tolerances (WINDOWS).*

i. Principal Maintenance Inspectors (PMI) assigned to operators that have CAMPs during the course of normal surveillance will review their operator's program to ensure that the inspection completion times average at or before the approved time/due date.

ii. PMIs will ensure that the use of WINDOWS in their operators' CAMPs do not allow the accumulation of time resulting in an overall escalation in the inspection interval.

iii. Operators/air carriers that are authorized short-term escalation will not be eligible for WINDOWS.

NOTE: This guidance supersedes any other orders, memorandums, or letters on this subject.

(c) Special work forms can be provided for accomplishing these tasks, or they can be specified by a work order or other document. Instructions and standards for accomplishing each task must be provided to ensure that the work is done in accordance with established procedures and is properly recorded.

(d) Special emphasis should be placed on recordkeeping requirements of a scheduled maintenance program, since past inspections have found that the status of a scheduled maintenance activity was not supported by adequate records. This has caused considerable problems in determining the current status of life-limited parts, AD requirements, overhaul records, etc., since the 14 CFR requires each operator to keep accurate maintenance records.

(3) *Unscheduled Maintenance.* This area provides procedures, instructions, and standards to accomplish maintenance tasks generated by the inspection.

(a) A continuous aircraft maintenance record can be used for occurrences and the resulting corrective actions between scheduled inspections. Inspection discrepancy forms (non-routine coupons) process unscheduled maintenance tasks in conjunction with scheduled maintenance.

(b) Instructions and standards for unscheduled maintenance are provided in the operator's technical manuals, consisting of the aircraft structural repair manual and manufacturer's maintenance manuals for aircraft, engine, propeller, and appliances. These manuals are a part of the approved CAMP, and must be used when performing maintenance.

(c) When there is no technical information available and maintenance is required, the operator must develop or acquire the data needed to perform the maintenance. This maintenance data must be evaluated as major or minor, according to the operator's procedures.

(d) Past inspections have revealed that procedures for determining major and minor repairs have

been deficient, and that some repairs have been improperly categorized. As a result, major repairs have been performed without FAA-approved data. Special emphasis must be made by ASIs to ensure that operators properly classify repairs.

(4) *Repair/Overhaul of Engine, Propeller, and Appliances.* This area concerns shop operations which, although they encompass scheduled and unscheduled tasks, are remote from the maintenance performed on the aircraft as a unit.

(a) Aircraft engine and propeller manuals containing instructions for installation, operation, servicing, and maintenance are accepted by the FAA. These manuals are accepted as part of type certification and are incorporated as part of the operator's manual system. They require no further review by the FAA.

(b) The appliance manufacturer's manual that the operator chooses to incorporate as a part of its maintenance manual is not formally approved. It is considered by the administrator to be acceptable data for accomplishing major or minor repairs.

(c) If the airframe, engine, or propeller manufacturer's instructions require special procedures, tolerances, or specifications, these instructions must prevail over the appliance manufacturer's instructions.

(d) The FAA can formally issue supplemental information, including ADs, that supersede all manufacturer's specifications.

(5) *Structural Inspection/Airframe Overhaul.* Most of the information required to develop an initial structural inspection program will be developed by the manufacturer.

(a) The scheduled inspection program provides the framework for all the scheduled maintenance packages. Structural inspections are normally integrated throughout the operator's scheduled maintenance program.

(b) The various levels of inspection must be clearly defined in the operator's program. For example, the area under consideration may require a visual inspection during pre-flight, where a higher inspection such as "B" or "C" check may require more than a visual inspection of the same area. A comprehensive inspection or airframe overhaul is usually referred to as a "D" check, and may include all, or nearly all, of the scheduled tasks in a maintenance program.

(6) *Structural Inspection Document Requirements.* When the operator has aircraft that are identified in a particular structural inspection document, the operator must incorporate these additional age-related structural inspections into its scheduled inspection program.

(7) *Required Inspection Items (RII).* This area concerns maintenance work which, if improperly accomplished, could endanger the safe operation of the aircraft. RII items appear in all elements of the operator's CAMP. They receive the same consideration regardless of

whether or not they are related to scheduled or unscheduled tasks. The fact that an RII requirement arises at an awkward time or inconvenient location has no bearing on the need to accomplish it properly.

(a) The operator must designate those items that need to be inspected, and must develop methods for performing the required inspections. The operator should consider the following when determining what tasks to designate as RII items:

- Installation, rigging, and adjustments of flight controls and surfaces
- Installation and repair of major structural components
- Installation of an aircraft engine, propeller or rotor, and the overhaul or calibration of certain components, such as engines, propellers, transmissions, and gearboxes, or navigational equipment, the failure of which would affect the safe operation of the aircraft

(b) It is the responsibility of the operator to evaluate the work program and identify RII items in a suitable manner. The ASI must evaluate the proposed list of RII items to determine if it is adequate.

(c) RII item findings consistently represent a major portion of an inspection. The following are examples of these findings:

- No specific training programs developed for RII personnel
- No authorization list of RII inspectors
- RII items not accomplished
- RIIs performed by unauthorized persons
- Failure to comply with RII procedures
- Contract personnel not properly trained/qualified/authorized
- Lack of proper RII-designated items
- Failure to have countermand procedures

E. Special Maintenance/Safety Considerations.

(1) There exists, in transport category aircraft, a potential hazard consisting of fires in inaccessible areas of the aircraft and the resulting hazards to cabin occupants.

(a) During original certification of the aircraft, clean or uncontaminated material, such as insulation blankets, will not readily support combustion. However, after extended periods of service they have been found to be contaminated with lint, dirt, oily films, lubricant, fuel, and corrosion inhibitors that are conducive to ignition by low intensity ignition sources. Low intensity ignition sources can consist of the following:

- Arc tracking of aircraft wiring and/or fluorescent light ballasts

- Arcing light sockets and/or battery ground cables

(b) It is recommended that each ASI review the operator's CAMP to determine if an effective quality control procedure is in place that would discover these insulation breakdowns. In addition, ASIs should ensure that the program addresses the periodic inspection of aircraft wiring and the removal of contaminants, especially in inaccessible areas.

(c) ASIs should also be aware of the conditions associated with Kapton insulation breakdown. Operators should be advised to exercise caution in exposing the aircraft wiring to the adverse conditions under which they have control, notably:

- Increased strain (tighter wire bends)
- Water
- Exposure to high pH content cleaning compounds

(2) *Emergency and Flotation Equipment.* Air carriers are not allowed to deviate from compliance with 14 CFR sections 121.309(b)(1) and 135.421 (a) and (b), pertaining to the regular inspection of emergency and flotation equipment. The frequency of inspection is the interval defined in the air carrier's OpSpecs-controlled maintenance program.

(a) Specific guidance on frequency of inspection and life-limits are contained in the respective manufacturer's maintenance manuals. Most life vest manufacturer's manuals address the age issue of life preservers. The manuals state that if the vests are over 10 years old and cannot pass the leakage test or require repair or replacement parts, that they are non-repairable. If a particular operator is experiencing failure rates at periods shorter than 10 years, that operator's inspection interval should be changed to adjust for certain environmental conditions or unique handling situations.

(b) ASIs should review their operator's maintenance program to ensure the effectiveness of the inspection intervals for emergency and flotation equipment and to ensure regulatory compliance. The ASI should also review the operator's failure rate to determine if an adjustment to the inspection interval should be considered.

(3) ASIs should audit the oral and written changeover procedures between arriving and departing maintenance shifts, required by their applicable manuals, to ensure that the exact status of all phases of "maintenance in progress" is accurately transferred between shifts.

(4) ASIs should insure that a lightning/High Intensity Radiated Fields (HIRF) protection maintenance program is submitted to the CHDO. Operators of older generation aircraft with mainly analog electrical/electronic (non-digital)

controls and displays must ensure that their maintenance programs include lightning inspection tasks. An integral part of this program is a developed sequence of inspections that are required in the event of exposure to lightning and/or HIRF environment, as well as maintenance/inspection due to aging and environmental degradation of aircraft or during heavy zone inspections. The program should address protection features such as structural shielding, insulation degradation, and electrical bonding integrity. The lightning and HIRF protection maintenance program should be prepared within the existing framework of maintenance activities such as AC 121-22A, Maintenance Review Board. As a minimum this plan should:

(a) Identify aircraft flight critical systems and equipment, associated wiring, and locations on aircraft.

(b) Identify aircraft systems and/or line replaceable units (LRU) that may be affected by exposure to lightning/HIRF, and whose proper operation is critical to the operation of the aircraft. Determine equipment locations within the aircraft and the routing of wiring between LRUs.

(c) Determine if any of the critical systems and equipment are mounted outside the protective structure of the aircraft. The assurance program should provide information on assessing the protection level of these components and assemblies.

(d) Identify specific lightning and HIRF protection features, including wire shields, connectors, bonding jumpers, structural shielding, and terminal protection devices.

(e) The plan should identify and detail the type and frequency of inspections and maintenance. The plan should include requirements for test and inspection of electromagnetic protection installed within the equipment, if identified and required by the equipment manufacturer.

(f) Identify items which rely on shield and connector bonding, sealing materials, ground jumpers, structural field foil liners, etc., for electromagnetic protection. Provide a program for evaluation and determination that proper protection is provided. Maintenance efforts should make sure that these items are properly identified to preclude the possibility of degradation or accidental removal during normal aircraft maintenance that could negate or eliminate the designed protection.

(g) Identify devices which may degrade in time due to corrosion, fretting, flexing cycles or other causes.

(h) The results of the tests made during the performance of the inspection program should be evaluated to ascertain if the maintenance program needs additions/deletions, escalation or reduction in inspection intervals, and the impact on scheduled/unscheduled maintenance programs.

SECTION 2. PROCEDURES

1. PREREQUISITES AND COORDINATION REQUIREMENTS.

A. Prerequisites:

- Knowledge of the regulatory requirements of 14 CFR parts 121, 129 and 135, as applicable
- Successful completion of the Airworthiness Inspectors Indoctrination course or previous equivalent
- Familiarity with the operator's maintenance procedures manual and operations specifications
- Familiarity with the type of aircraft being inspected

B. Coordination. This task requires coordination between the assigned Principle Maintenance Inspector (PMI), the Principle Avionics Inspector (PAI), and FAA supervisory personnel.

3. REFERENCES, FORMS, AND JOB AIDS.

A. References:

- 14 CFR sections 43.13(a) and 43.13(c)
- Advisory Circular (AC) 120-16, Continuous Airworthiness Maintenance Programs, as amended
- Maintenance Steering Group (MSG) 2 and 3 documents
- Operator's OpSpecs (Part D)
- Operator's maintenance procedures manual

B. Related Reading Material. A comprehensive discussion of issues relating to lightning and HIRF environment can be found in the following:

- AC 20-53, Protection of Airplane Fuel Systems Against the Fuel Vapor Ignition Due to Lightning, current edition
- AC 20-136, Protection of Aircraft Electrical/Electronic Systems Against the Indirect Effects of Lightning, current edition
- RTCA Document DO-160, Environmental Conditions and Test Procedures for Airborne Equipment, current edition
- DOT/FAA/CT-89/22, Aircraft Lightning Protection Handbook, F. A. Fisher, J. A. Plumer, and R. A. Perala

C. Forms. None.

D. Job Aids. None.

5. PROCEDURES.

A. Review the Operator's OpSpecs. Determine what the applicable maintenance program requirements are.

B. Review the Operator's Manual System. Ensure that the manual system includes procedures for accomplishing the following:

(1) Aircraft Inspection Requirements.

(a) Ensure that the maintenance manual contains detailed instructions for accomplishing required inspections and checks.

(b) Compare a scheduled check (lettered, phased, numbered, etc.) work package to the OpSpecs inspection requirements to ensure that all items are included and are scheduled at the appropriate inspection intervals.

(c) Sample items identified for inspection/check and ensure that the work packages have been developed to accomplish these items. The work packages must be appropriate to the identified maintenance process, e.g., visual inspections, detailed inspections, functional checks.

NOTE: A "C" check work package is preferred due to its size and complexity.

(d) Ensure that work packages include provisions for the accountability and recording of these inspection tasks.

(e) Ensure that there are provisions for accountability and recording of non-routine maintenance resulting from the findings of the scheduled inspection.

(2) Scheduled Maintenance Requirements.

(a) Sample items requiring scheduled maintenance to ensure the following:

- Work forms, job cards, and other methods have been developed
- Work forms, cards, and/or methods provide detailed instructions and standards for performing the scheduled maintenance, i.e., servicing/lubrication tasks, restoration tasks, replacement of parts or components with hard-time limitations

NOTE: When performing a sampling review of a revision to the maintenance instructions, job cards/tasks, lubrication change, etc., if there is any doubt as to the soundness of the request, the ASI should coordinate the request with the appropriate Aircraft Certification Office (ACO).

(b) Ensure that there are provisions for the accountability and recording of the following:

- Scheduled maintenance tasks

- Non-routine maintenance resulting from the scheduled maintenance

(3) *Unscheduled Maintenance Requirements.*

(a) Ensure that the operator has procedures, instructions, and standards to accomplish maintenance that results from inspection findings, operational malfunctions, abnormal operations (hard landings, lightning strikes, etc.) or other indications of the need for maintenance, such as corrective action from failure analysis.

(b) Ensure that the operator has procedures for evaluating repair requirements to properly classify the repair as major or minor.

NOTE: All repairs categorized by the operator as major require FAA-approved repair data.

(c) Ensure that the operator has provisions for accounting and recording all unscheduled maintenance activity, i.e., manual sections for handling unscheduled maintenance activity.

(4) *Repair and Overhaul of Engines, Propellers, and Appliances.*

(a) Ensure that the operator has provided instructions and standards to accomplish repair and overhaul tasks for those items requiring repair and overhaul.

(b) Identify and select several aircraft components from the OpSpecs or controlling documents with overhaul requirements. These components will be used during the on-site inspection to ensure that the operator has repair/overhaul specifications available.

(c) Ensure that the operator has provisions for certifying and recording the work.

(d) Document those items selected for future on-site inspection.

(5) *Structural Inspection/Airframe Overhaul.*

(a) Ensure that the operator has instructions and standards for performing structural inspections and airframe overhauls.

(b) Sample selected scheduled structural inspection/airframe overhaul items to ensure that work forms, job cards, and/or other methods are available for performing these tasks.

(c) Ensure that the operator has established provisions for accountability and recording of these tasks.

(6) *Structural Inspection Document Requirements, if applicable.*

(a) Ensure that the operator has identified those aircraft required to be included in a structural inspection program. Compare the operator's aircraft serial numbers

with the serial numbers in the structural inspection document to ensure that all required aircraft are included.

(b) Ensure that the operator has instructions and standards for performing inspections on those aircraft subject to supplemental structural inspections as identified in the structural inspection document.

(c) Ensure that the operator has provisions for accounting and recording the work.

(d) Identify and document any aircraft not being maintained according to the Supplemental Structural Inspection Document (SSID) requirements.

(7) *Required Inspection Item (RII) Requirements.*
Ensure the following:

(a) That the operator has designated those maintenance tasks requiring additional inspections (RII inspections).

(b) That the operator has developed procedures to meet the certification, training, qualification, and authorization requirements for RII personnel.

(c) That the operator has procedures for ensuring the accomplishment of RII items.

(d) That the operator has procedures for the buy-back of items that failed the RII inspection and require re-inspection after additional corrective action.

(e) That the operator has procedures and standards for accepting or rejecting RII items.

(f) That the operator has procedures that prevent any person who performs an item of work from performing a RII inspection of that work.

(g) That the operator has procedures for ensuring that the persons performing RII inspections are under the control and supervision of the inspection unit.

(h) That the operator has procedures for ensuring a current list of RII inspectors is maintained, including all names, occupational titles, and inspections they are authorized to perform.

(i) That the operator has procedures to prevent any inspector's decision regarding a required inspection from being countermanded. Exceptions include supervisory personnel of the inspection unit or a person at the level of administrative control that has overall responsibility for the management of the required inspection function and other maintenance.

(j) That the operator has shift-change procedures for RII items to include designating the individual responsible for briefing the arriving shift's supervisors and personnel of the exact status of maintenance in progress. These procedures must also include accounting for the in-progress maintenance status in the operator's work packages.

C. Significant Differences Between Flight Cycle and Flight Time Relationship Affecting Airplane Maintenance Programs. PMIs review existing and future maintenance requirements to verify their operators conform to the following:

(1) An operator's inspection or maintenance program must provide for timely detection of both flight time- and flight cycle-related deficiencies. Operators that have a flight hour maintenance program also must take into consideration flight cycle and calendar inspection and maintenance tasks.

(2) For airplanes that accumulate numerous flight cycles (landing and pressurization) per flight hour, the maintenance or inspection program must cover all flight cycle-related items (systems and structure), and ensure that no adverse trend (high component removal rate or early fatigue cracking in primary structure) is occurring. If adverse trends are occurring, then a program change may be needed. If early fatigue cracking is occurring, the PMI will consult with the FAA ACO before a program change is considered.

(3) For airplanes that accumulate more flight hours per flight cycle, the inspection and maintenance program must consider all structures that are sensitive to gust and maneuvering loads (wings and empennage). If a structure is experiencing fatigue cracking at current inspection intervals, then a program change may be needed. If early fatigue cracking is occurring, the PMI will consult with the ACO before a program change is considered.

(4) SSID programs are mandated by AD. The SSID inspection interval cannot be increased or decreased without FAA ACO approval.

(5) Airplanes that are designed to damage tolerance requirements must have an FAA-approved Airworthiness Limitations Section as part of the Instructions for Continued Airworthiness. The inspections contained in the Airworthiness Limitations Section cannot be increased or decreased without FAA ACO approval.

D. Perform the Inspection at the Operator's Facility.

From the components selected during the review of the repair/overhaul requirements, accomplish the following:

(1) Ensure that the shop performing the repair/overhaul of these components has the overhaul manual available. Review this manual to ensure the following:

- The manual is appropriate to the make and model of the components being repaired/overhauled

- The manual is part of the operator's manual system
- The manual is current

NOTE: For manufacturer's manuals, contact the manufacturer to verify the date and contents of last revision.

- Special tool/test equipment requirements are appropriate to the work being accomplished

(2) Ensure that the shops have the specialized tools/test equipment as required by the manuals.

(3) Determine if personnel are properly trained to perform the maintenance by reviewing the training records. These records may be found in the shop or in other locations established by the operator.

(4) Ensure that the operator's procedures for approval for return to service and any other recordkeeping requirements are being followed.

NOTE: If any discrepancies are noted in any of the above procedures, notify the appropriate supervisory/management personnel to initiate corrective action.

(5) Ensure that the operator has procedures that designate the individual responsible for briefing the arriving shift's supervisors and personnel of the exact status of maintenance in progress. These procedures must also include accounting for the in-progress maintenance status in the operator's work packages.

E. Coordinate The Findings. Due to the seriousness of any finding from this job task, discuss any deficiencies with the appropriate FAA supervisory personnel to verify the inspection findings.

7. TASK OUTCOMES.

A. File PTRS Data Sheet.

B. Completion of this task may result in the following, as applicable:

- A follow-up letter informing the operator of all inspection findings and corrective actions, as required
- Initiation of an FAA Form 2150.5, Enforcement Investigation Report

C. Document Task. File all supporting paperwork in the operator's office file.

9. FUTURE ACTIVITIES. Follow up on corrective actions taken by the operator, as applicable.